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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/673,615	09/29/2003	Ravi Ramanathan	61537B	2556

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THE DOW CHEMICAL COMPANY  
INTELLECTUAL PROPERTY SECTION  
P. O. BOX 1967  
MIDLAND, MI 48641-1967

EXAMINER
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BRUENJES, CHRISTOPHER P

ART UNIT	PAPER NUMBER
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1772

DATE MAILED: 07/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/673,615

Applicant(s)

RAMANATHAN ET AL.

Examiner

Christopher P Bruenjes

Art Unit

1772

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 April 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-15, 21, 23-30 and 39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15, 21, 23-30 and 39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 September 2003 and 07 April 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 20031027.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Election/Restrictions***

1. Applicant's election without traverse of Group I, claims 1-15, 21, and 23-30 in the reply filed on April 7, 2005 is acknowledged.

2. Claims 16-20 and 31-38 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected inventions, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on April 7, 2005.

***Drawings***

3. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because the current drawings are informal and it is difficult to differentiate the individual parts of the drawings from the hand drawn drawings. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid

Art Unit: 1772

abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
4. Claims 1-15, 29 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al (USPN 5,928,745) in view of Zharov et al (USPN 5,539,070).

Art Unit: 1772

Wood et al teach a fuel tank comprising a core layer of a fuel barrier polymer including fluoropolymers, polyamides polyesters or polyether ketones, etc. (col.5, 11.13-39 and col.6, 11.44-52) and a thermoplastic extrusion of HDPE on the inner and outer layer surrounding the barrier core layer (col.4, 11.59-64). The fuel tank comprises two or more sections bonded together with an adhesive that bonds to the thermoplastic resins used to form the fuel tank (col.7, 11.57-61). As defined by the instant specification high density polyethylene is a low surface energy material. Therefore, because Wood et al teach adhesive bonding of the fuel tanks made of high density polyethylene, Wood et al inherently teach that the adhesive bonds low energy surface materials. Little patentable weight is given to the shape of the sections before being used to form the fuel tank, the same structure of the fuel tank is achievable regardless of what the shape of the individual sections was before bonded together to form the tank. Similarly, no patentable weight is given to the process of forming the individual sections. The sections are formed by blown thermoplastic extrusion, solvent casting, thermoforming, blow molding, or injection molding. Little patentable weight is given to the process of forming the fuel tank and Wood et al teach that the tank is made as a single unit (col.7, 11.57-58). Wood et al teach a filler tube and fuel

Art Unit: 1772

line, which are components having a first open end and a second open end, the first open end extending outwardly through an opening in the tank wall, and the second open end extending inwardly into the tank until it is in contact with the periphery of the tank wall opening and obviously bonded thereto by an adhesive because it must be bonded to the tank wall opening in order to function as a filler tube or fuel line for the fuel tank and adhesive bonding is taught by Wood et al as a method of bonding parts of the fuel tank together.

Wood et al fail to teach that the adhesive has a lap shear strength of about 400 psi or greater and which does not require surface pretreatment of the low surface energy materials or that the adhesive comprises an amine/organoborane complex. However, Zharov et al teach several organoborane/amine complexes used for acrylic adhesives that are embraced by the instant claims when both  $R^1$  and  $R^2$  are alkyl and 'b' equals 0 and 'a' equals 1, especially compounds 6, 9, etc. (col.12, table 1). The adhesive composition with organoborane amine complex initiator are used for bonding low surface energy substrates such as polyethylene that otherwise requires costly surface preparation techniques (col.4, 11.1-6). An adhesive with the same composition and make up will have the same characteristics including having a lap shear strength of about 400 psi or greater, supporting a load of

Art Unit: 1772

1334 Newtons and having a fuel vapor permeation rate of not more than  $46\text{g-mm/m}^2/\text{day}$ . One of ordinary skill in the art would have recognized that amine-organoborane complex containing adhesives are substituted for other adhesives when the adhesive is used to bond low surface energy substrates such as polyethylene, because unlike other known adhesives the adhesive containing amine-organoborane complex can be bonded effectively to low surface energy materials without the need for costly substrate surface preparation techniques, as taught by Zharov et al, especially in column 1, lines 18-60 and column 4, lines 1-6.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to use an adhesive comprising an amine/organoborane complex, which will have the same properties as the claimed adhesive since the adhesive is the same composition, taught by Zharov et al as the adhesive joining sections of a fuel tank together to form the tank of Wood et al because the adhesive comprising an amine/organoborane complex is useful for bonding low surface energy substrates without costly surface preparation including polyethylene, which is commonly used to form fuel tanks, as taught by Zharov et al. An adhesive that bonds low surface energy substrates without costly surface preparation techniques will cut production costs.

Art Unit: 1772

5. Claims 1-15, 29, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Straetz (USPN 6,454,114) in view of Zharov et al (USPN 5,539,070).

Straetz teaches a fuel tank comprising a core layer of a fuel barrier polymer including polyamides (col.2, 11.10-12) and a carrier material of HDPE on the inner and outer layer surrounding the barrier core layer (col.2, 11.8-10). The fuel tank comprises two or more sections bonded together with an adhesive that bonds to the thermoplastic resins used to form the fuel tank, which are low energy surface materials (col.2, 11.40-44). Little patentable weight is given to the shape of the sections before being used to form the fuel tank, the same structure of the fuel tank is achievable regardless of what the shape of the individual sections was before bonded together to form the tank. Similarly, Little patentable weight is given to the process of forming the individual sections. The sections are clam shells (fig.2) formed by co-extrusion blow molding (col.1, 11.63-66). The tank is manufactured with additional fittings attached or installed in the halves (col.3, 11.31-40). Straetz teaches that the components are attached to the tank by adhesion because he teaches that connections when forming the fuel tank are either welded or adhesive bonded. The fuel tank

Art Unit: 1772

components are obviously made up of thermoplastic or thermosetting polymers or steel including polyethylene because the fuel tank itself is composed of polyethylene and the claimed materials are all well known in the art of fuel tanks and fuel tank components.

Straetz fails to teach that the adhesive has a lap shear strength of about 400 psi or greater and which does not require surface pretreatment of the low surface energy materials or that the adhesive comprises an amine/organoborane complex. However, Zharov et al teach several organoborane/amine complexes used for acrylic adhesives that are embraced by the instant claims when both  $R^1$  and  $R^2$  are alkyl and 'b' equals 0 and 'a' equals 1, especially compounds 6, 9, etc. (col.12, table 1). The adhesive composition with organoborane amine complex initiator are used for bonding low surface energy substrates such as polyethylene that otherwise requires costly surface preparation techniques (col.4, 11.1-6). An adhesive with the same composition and make up will have the same characteristics including having a lap shear strength of about 400 psi or greater, supporting a load of 1334 Newtons and having a fuel vapor permeation rate of not more than 46g-mm/m<sup>2</sup>/day. One of ordinary skill in the art would have recognized that amine-organoborane complex containing adhesives are substituted for other adhesives when the adhesive is used to

Art Unit: 1772

bond low surface energy substrates such as polyethylene, because unlike other known adhesives the adhesive containing amine-organoborane complex can be bonded effectively to low surface energy materials without the need for costly substrate surface preparation techniques, as taught by Zharov et al, especially in column 1, lines 18-60 and column 4, lines 1-6.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to use an adhesive comprising an amine/organoborane complex, which will have the same properties as the claimed adhesive since the adhesive is the same composition, taught by Zharov et al as the adhesive joining sections of a fuel tank together to form the tank of Straetz because the adhesive comprising an amine/organoborane complex is useful for bonding low surface energy substrates without costly surface preparation including polyethylene, which is commonly used to form fuel tanks, as taught by Zharov et al. An adhesive that bonds low surface energy substrates without costly surface preparation techniques will cut production costs.

6. Claims 21 and 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al (USPN 5,928,745).

Art Unit: 1772

Wood et al teach a fuel tank assembly comprising a fuel tank and fuel tank components including fuel pump, fuel line, an instrument opening, a filler tube and mounting flanges made up of any composition including polymers or steel, which are the known materials used in the art of fuel tank components (col.3, 11.59-61), but fails to explicitly teach a means for attaching the components to the tank. However, Wood et al teach joining tank sections to form a tank by hot melt adhesives or thermosetting adhesives (col.3, 11.51-54). One of ordinary skill in the art would have recognized that adhesives are also used to join fuel components to the fuel tank if adhesives are used to join sections of the fuel tank to form the tank. Also it would have been obvious to one of ordinary skill in the art to add a second seal of adhesive to a primary seal when joining components to the fuel tank in order to increase sealability.

Therefore, it would have been obvious to one of ordinary skill in the art at the time that applicant's invention was made to join fuel tank components by means of an adhesive to the fuel tank made from adhesively joined sections and to add a second seal to the primary seal in order to increase sealability. Additionally, note that the method of making an article receives little patentable weight in article claims, and therefore how the components are joined to the fuel tank receives little

Art Unit: 1772

patentable weight. Joining the components by a different method other than adhesive serves the same function and therefore any method of permanent sealing of the component to the fuel tank such as welding performs the equivalent function of permanently sealing the two articles together and determining which method to use is within the level of ordinary skill in the art, absent the showing of unexpected result.

7. Claims 21 and 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Straetz (USPN 6,454,114).

Straetz teaches a fuel tank assembly comprising a fuel tank and fuel tank components including fuel pump, fuel line, an instrument opening, a filler tube and mounting flanges made up of any composition including polymers or steel, which are the known materials used in the art of fuel tank components (col.3, 11.59-61), but fails to explicitly teach a means for attaching the components to the tank. However, Straetz teaches joining tank sections to form a tank by means of adhesive bonding (col.2, 11.40-44). One of ordinary skill in the art would have recognized that adhesives are also used to join fuel components to the fuel tank if adhesives are used to join sections of the fuel tank to form the tank. Also it would have been obvious to one of ordinary skill in the art to add a second seal of

Art Unit: 1772

adhesive to a primary seal when joining components to the fuel tank in order to increase sealability.

Therefore, it would have been obvious to one of ordinary skill in the art at the time that applicant's invention was made to join fuel tank components by means of an adhesive to the fuel tank made from adhesively joined sections and to add a second seal to the primary seal in order to increase sealability. Additionally, note that the method of making an article receives little patentable weight in article claims, and therefore how the components are joined to the fuel tank receives little patentable weight. Joining the components by a different method other than adhesive serves the same function and therefore any method of permanent sealing of the component to the fuel tank such as welding performs the equivalent function of permanently sealing the two articles together and determining which method to use is within the level of ordinary skill in the art, absent the showing of unexpected result.

8. Claims 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al (USPN 5,928,745) or Straetz (USPN 6,545,114) in view of Yang et al (USPN 6,110,544).

Wood et al or Straetz teach all that is claimed in claim 21 as shown above, but fail to explicitly teach coating the tank

Art Unit: 1772

and components with a vapor phase plasma coating. However, Yang et al teach vapor phase plasma coating as a method of applying protective coatings on plastic surfaces including shaped articles. The protective coating is deposited material, which provides protection against abrasion and UV degradation and reflects IR radiation (col.1, 11.6-16). One of ordinary skill in the art would have recognized that fuel tanks require protection from UV, IF, and abrasion because fuel tanks are exposed to UV and IF from the sun and the salt, sand, rocks, and other particles on the roads are kicked up by the tires and potentially damage plastic fuel tanks on automobiles and degradation of a fuel tank would lead to leaking of the fuel tank. Therefore, one of ordinary skill in the art would have recognized that a protective coating is useful when forming a fuel tank and that a protective coating is added to fuel tanks in order to protect from abrasion, UV degradation, and IR radiation, as taught by Yang et al.

Thus, it would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to apply the vapor phase plasma protective coating of Yang et al to the fuel tank of Wood et al or Straetz in order to protect the fuel tank from abrasion, UV degradation, and IR radiation, as taught by Yang et al.

9. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al (USPN 5,928,745) or Straetz (USPN 6,454,114) in view of Chan et al (US 2002/0172788 A1).

Wood et al or Straetz teach a fuel tank assembly comprising a plastic fuel tank having a wall with an outwardly extending cylindrical opening and comprising a multilayer structure having inner and outer layers of low energy surface materials and a fuel barrier layer there between and plastic components attached or joined to the fuel tank wall along the periphery of the fuel tank wall opening by means of an adhesive having adequate structural strength, fuel resistance, sealing and vapor emission properties (as discussed above). However, Wood et al or Straetz do not explicitly teach the plastic component comprising a multilayer structure. However, Chan et al teach components for fuel containers having a single-layered structure or a multi-layered structure that comprises an inner and outer layer of a polyolefin and a barrier layer of a barrier resin including polyamide (p.15, col.1, 11.1-6).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a multi-layered structure comprising a barrier material for the fuel components attached to the fuel tank by adhesive in Wood et

Art Unit: 1772

al or Straetz, in order to lower vapor emission properties as taught by Chan et al.

### **Conclusion**

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher P Bruenjes whose telephone number is 571-272-1489. The examiner can normally be reached on Monday thru Friday from 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon can be reached on 571-272-1498. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Christopher P Bruenjes  
Examiner  
Art Unit 1772

CPB  
CPB  
July 5, 2005

  
HAROLD PYON  
SUPERVISORY PATENT EXAMINER

1772

7/5/05